

WE CLAIM:

1. A method of generating masks for printing a pattern having vertically oriented features and horizontally oriented features on a substrate utilizing dipole illumination, said method comprising the steps of:

identifying background areas contained in said pattern;

generating a vertical component mask comprising non-resolvable horizontally oriented features in said background areas; and

generating a horizontal component mask comprising non-resolvable vertically oriented features in said background area.

2. The method of generating masks according to claim 1, wherein said step of generating said vertical component mask includes:

identifying horizontally oriented features contained in said pattern and providing shielding for said horizontally oriented features; and

applying optical proximity correction assist features to vertically oriented features contained in said pattern,

said vertical component mask being utilized to image said vertically oriented features on said substrate.

3. The method of generating masks according to claim 1, wherein said step of generating said horizontal component mask includes:

identifying vertically oriented features contained in said pattern and providing shielding for said vertically oriented features; and

applying optical proximity correction assist features to horizontally oriented features contained in said pattern,

said horizontal component mask being utilized to image said horizontally oriented features on said substrate.

4. The method of generating masks according to claim 1, wherein said background areas do not contain any features to be imaged on said substrate.

5. The method of generating masks according to claim 1, wherein said non-resolvable horizontally oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width.

6. The method of generating masks according to claim 5, wherein said non-resolvable horizontally oriented features have the same pitch.

7. The method of generating masks according to claim 1, wherein said non-resolvable vertically oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width.

8. The method of generating masks according to claim 7, wherein said non-resolvable vertically oriented features have the same pitch.

9. A method of printing a pattern having vertically oriented features and horizontally oriented features on a substrate utilizing dipole illumination, said method comprising the steps of:

identifying background areas contained in said pattern;

generating a vertical component mask comprising non-resolvable horizontally oriented features in said background areas;

generating a horizontal component mask comprising non-resolvable vertically oriented features in said background area;

illuminating said vertical component mask utilizing an X-pole illumination; and

illuminating said horizontal component mask utilizing a Y-pole illumination.

10. The method of printing a pattern according to claim 9, wherein said step of generating said vertical component mask includes:

identifying horizontally oriented features contained in said pattern and providing shielding for said horizontally oriented features; and

applying optical proximity correction assist features to vertically oriented features contained in said pattern.

11. The method of printing a pattern according to claim 9, wherein said step of generating said horizontal component mask includes:

identifying vertically oriented features contained in said pattern and providing shielding for said vertically oriented features; and

applying optical proximity correction assist features to horizontally oriented features contained in said pattern.

12. The method of printing a pattern according to claim 9, wherein said background areas do not contain any features to be imaged on said substrate.

13. The method of printing a pattern according to claim 10, wherein said shielding prevents illumination of said horizontally oriented components when said vertical component mask is illuminated.

14. The method of printing a pattern according to claim 11, wherein said shielding prevents illumination of said vertically oriented components when said horizontal component mask is illuminated.

15. The method of printing a pattern according to claim 9, wherein said non-resolvable horizontally oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width.

16. The method of printing a pattern according to claim 15, wherein said non-resolvable horizontally oriented features have the same pitch.

17. The method of printing a pattern according to claim 9, wherein said non-resolvable vertically oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width.

18. The method of printing a pattern according to claim 17, wherein said non-resolvable vertically oriented features have the same pitch.

19. An apparatus for generating masks for printing a pattern having vertically oriented features and horizontally oriented features on a substrate, said apparatus comprising:

means for identifying background areas contained in said pattern;

means for generating a vertical component mask comprising non-resolvable horizontally oriented features in said background areas; and

means for generating a horizontal component mask comprising non-resolvable vertically oriented features in said background area.

20. The apparatus of claim 19, wherein said background areas do not contain any features to be imaged on said substrate.

21. The apparatus of claim 19, wherein said non-resolvable horizontally oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width.

22. The apparatus of claim 21, wherein said non-resolvable horizontally oriented features have the same pitch.

23. The apparatus of claim 19, wherein said non-resolvable vertically oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width.

24. The apparatus of claim 23, wherein said non-resolvable vertically oriented features have the same pitch.

25. A computer program product for controlling a computer comprising a recording medium readable by the computer, means recorded on the recording medium for directing the computer to generate files corresponding to masks for printing a pattern having vertically oriented features and horizontally oriented features in a multiple-exposure lithographic imaging process, said generation of said files comprising the steps of:

- identifying background areas contained in said pattern;

- generating a vertical component mask comprising non-resolvable horizontally oriented features in said background areas; and

- generating a horizontal component mask comprising non-resolvable vertically oriented features in said background area.

26. The computer program product of claim 25, wherein the step of generating said vertical component mask includes:

- identifying horizontally oriented features contained in said pattern and providing shielding for said horizontally oriented features; and

- applying optical proximity correction assist features to vertically oriented features contained in said pattern,

- said vertical component mask being utilized to image said vertically oriented features on said substrate.

27. The computer program product of claim 25, wherein said step of generating said horizontal component mask includes:

- identifying vertically oriented features contained in said pattern and providing shielding for said vertically oriented features; and

applying optical proximity correction assist features to horizontally oriented features contained in said pattern,

said horizontal component mask being utilized to image said horizontally oriented features on said substrate.

28. The computer program product of claim 25, wherein said background areas do not contain any features to be imaged on said substrate.

29. The computer program product of claim 25, wherein said non-resolvable horizontally oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width and the same pitch.

30. The computer program product of claim 25, wherein said non-resolvable vertically oriented features comprise a plurality of individual lines extending parallel to one another, each of said individual lines having the same width and the same pitch.